

Appendix H

COIC Development Example

H-1. Example

This appendix provides a situation and a school solution regarding a COIC development example. It is intended to demonstrate the thought process involved in developing a set of COIC with few issues and criteria defining a good enough system for FRP. This is a fictitious case based on actual cases.

H-2. Situation and solution

See figures H-1 and H-2 for the example and solution.

The Situation:

System -- Communications system including radio set (component of the user system) and net control station (NCS) with generator, vehicle, and crew.

Need -- High speed, secure and nonsecure, jam resistant data communications for automated systems.

Mission -- Deploy to theater of operations, set up, initialize net, provide continuous communications support, and relocate components (frequently) to survive.

Deployment -- Light forces divisions through battalion command posts and key operational units.

Employment

- Combined and joint operations control
- Division systems control manages net
- NCS support (dedicated team with vehicle)
- Radio set support (standard logistics)

Acquisition Strategy

- Developmental system (NCS and radio set)
- Uses standard truck, shelter, and generator
- ORD and MS B completed
- ORD being updated for MS C (LRIP based on technical and early user tests)
- FRP Decision (full-rate production based on developmental tests and IOT)

ORD Requirements Emphasis

- Connectivity between users (communications link exists)
- Continuity of operations during movement and maintenance
- NCS set up, tear down, and net initialization times
- Aerial deployment for NCS (radio certified with user)
- Allied and combined operations interoperability
- RAM for NCS and radio set

ORD Requirements

1. User connectivity 90% of the time in a benign environment.
2. User connectivity 80% of the time in an electronic warfare (EW) environment.
3. User through-put (messages/hour) identified by the user.
4. User speed of service requirement identified by the user (not more than a factor of 3 degradation in an EW environment for priority messages).
5. Continuity of net operations (NCS/radios) during movement and maintenance.
6. NCS roll-on/off transportability via C-130.
7. NCS certified for air drop and deployment.
8. NCS set up (first radio in net) within 45 minutes.
9. NCS tear down and depart site within 45 minutes.
10. High-altitude electro-magnetic pulse (HAEMP) and nuclear, biological, and chemical contamination (NBCC) survivable.
11. Employed in hot, basic, and cold climates.
12. Communications interface with allied and other service communications systems used with automated control systems.
13. School NCS training will include training device (one trainer station and four (4) student stations); unit sustainment training will be supported by an exportable training package.
14. Reliability, availability, and maintainability (RAM): NCS A_o .9, Mean Time Between Operational Mission Failure (MTBOMF) 300 HR, and Maintenance Ratio (MR) 0.002; Radio Set A_o .95, MTBOMF 300 HR, and MR 0.0005

Specification Requirement -- 90% throughput success and 90% speed of service success given user connectivity exists.

Figure H-1 (PAGE 1). The situation

Operational Mode Summary/Mission Profile (OMS/MP) -- NCS set up within 45 minutes, operate for 2 hours, tear down within 45 minutes, movement 1 hour, 24 hour/day operations; radio set IAW user system OMS/MP.

Approved COI for Another Communications System

- Three Issues -- Does/Can it:
 - Provide secure voice and data communications which meets the user's need.
 - Deploy from garrison to field and operate IAW OMS/MP.
 - System with logistics sustain combat operations.
- Key criteria:
 - Probability of a message being sent and received in benign and EW environments.
 - Movement to field site in a single lift.
 - Set up and tear down times.
 - Sustained combat operations for 30 days.

Other Considerations

- Development test to verify technical characteristics.
- DIA approved threat package and scenario to be used in the initial operational test (IOT).
- IOT to test total operational system.
- Doctrine and Organization Test Support Package (TSP) to be used for employment in the IOT.
- COIC guidance: Sustainment COIC for a control system should address training maintaining proficiency in the unit and logistics sustaining combat operations for a period of time.
- Approved COIC for another system included.

Figure H-1 (PAGE 2). The situation—Continued

A Solution:

Critical Operational Issues and Criteria (COIC)
for the AN/GRC-986(V) Communications System
for Test and Evaluation Master Plan (TEMP) Supporting
Milestone C

1.0 Issue: Does the AN/GRC-986(V) system provide high speed, secure and non-secure, jam resistant data communications for light forces automated control systems?

1.1 Scope: This issue examines the capability of the AN/GRC-986(V) to provide high speed, secure and non-secure, jam resistant communications support for light forces, to include combined and joint operations. A division slice will be played with radios for allies and other services control systems in a net. Communications measure of performance to be examined will be percentage of message traffic passed. The AN/GRC-986(V) will be operated and maintained by qualified soldiers in accordance with the Operational Mode Summary/Mission Profile (OMS/MP). Continuity of operations during movement and maintenance will occur as a normal part of operations. Employment will be in accordance with the Doctrinal and Organizational Test Support Package (TSP). MOPP IV level operations will be simulated.

1.2 Criterion: The AN/GRC-986(V) will pass at least 73% of the user required priority message traffic to the correct addressee within the user specified speed of service (SOS) (see note 3) in a benign environment, and at least 65% of priority messages with no more than a factor of 3 degradation in SOS in a threat EW environment.

1.3 Rationale: The AN/GRC-986(V) mission effectiveness is its capability to deliver information to the correct addressee in time to take necessary action. Criterion 1.2 was derived from ORD requirements paragraphs 1, 2, 3, and 4 (connectivity in benign and EW environments, throughput, and SOS) and specification requirements for 90% throughput and 90% SOS. Benign percentage = $.9 \times .9 \times .9 \times 100 = 73\%$. EW percentage = $.8 \times .9 \times .9 \times 100 = .65$.

2.0 Issue: Does the AN/GRC-986(V) system provide joint, combined, and intra-Army interoperability required to support light force operations.

2.1 Scope: This issue examines the ability of the AN/GRC-986(V) to interface with key joint, combined, and intra Army systems and exchange information as needed by light forces. Operations will be IAW the OMS/MP and the Doctrine and Organizational TSP. Threat representation will be IAW the Threat TSP.

2.2 Criterion: The AN/GRC-986(V) will interface with allied, other service, and intra-Army systems identified in note 4 and exchange information IAW with parameters set forth in the information exchange requirements matrix at note 4.

2.3 Rationale: For the AN/GRC-986(V) to effectively support light forces communications, it must at least interface with those systems identified at note 4 accomplish the exchanges specified. This criterion is an ORD KPP and is paragraph 4b(1) of the ORD. As per the KPP paragraph only those information exchange requirements identified as critical are included in note 4. The AoA supports the need for these interfaces.

3.0 Issue: Can the AN/GRC-986(V) be deployed from garrison to a field site while operating in accordance with the OMS/MP?

3.1 Scope: This issue examines the deployability of the AN/GRC-986(V) as a total operational system, that is, shelter/truck, mounted radio set, and NCS with organic generator. Specific modes/techniques of deployability addressed will be roll-on/roll-off and aerial delivery via Low Velocity Air Drop (LVAD) from C-130 aircraft. The crew will be deployed by separate aircraft. Additionally, data will be collected in benign and NBC (MOPP IV) environments in the time required to prepare the system (set up) for operation following crew/equipment link-up and/or arrival at the operations site, and to prepare the system (tear down) for survivability moves.

Figure H-2 (PAGE 1). A solution

3.2 Criteria:

3.2.1 The AN/GRC-986(V) net control station must be certified for the following transport and deployment methods:

- a. Roll-on and roll-off transport by C-130.
- b. LVAD (air drop) delivery.

3.2.2 The NCS crew must set up and have the first radio in the net within 45 minutes 90% of the time (time starts upon arrival on site). When dressed in MOPP IV, 60 minutes is allowed.

3.2.3 The NCS crew will tear down and depart site with median time less than 45 minutes after receipt of the move order. A median time of 60 minutes is allowed when dressed in MOPP IV

3.3 Rationale: While the AN/GRC-986(V) NCS will be transported via all modes, aerial deployability is most critical to light units. The NCS must be like deployable to the users it supports. The NCS must move to survive during combat.

3.3.1 Criterion 3.2.1 is derived from ORD paragraphs 6 and 7.

3.3.2 Criterion 3.2.2 comes from ORD requirement paragraph 8. Applying a 90 percent factor recognizes the possibility of shortfalls under realistic operational conditions. Set up is considered more time sensitive than tear down. An allowance of 15 additional minutes is made for MOPP IV degradation.

3.3.3 Criterion 3.2.3 is based on ORD requirement paragraph 9, with similar considerations to those for criteria 3.2.2. Median time is considered realistic for tear down.

4.0 Issue: Can AN/GRC-986(V) equipped units achieve training proficiency in garrison and provide a wartime readiness capability for sustained combat operations?

4.1 Scope:

4.1.1 This issue examines sustainment training provided to NCS crews. The unit training device, training publications and literature, and methods of instruction included in the program of instruction will be addressed. Training adequacy will be examined in terms of operator proficiency in performing critical tasks required to effectively employ the AN/GRC-986(V) (the critical tasks and standards to be met will be identified in the New Equipment Training TSP). Questionnaires and structured interviews with the test participants, instructors, and test directorate personnel regarding the adequacy of training, the training device, training materials, and operator acceptability of training manuals in accordance with AR 25-30 will be conducted. Also addressed will be correctness, applicability, format, degree of detail, and ease of use of publications.

4.1.2 This issue also encompasses an evaluation of the maintenance concept, the system support package (SSP), and PLL/ASL under realistic operational conditions. To be examined are the dedicated NCS maintenance team, and logistics support hardware and software needed to support the system. Hardware includes tools and test equipment. Software includes technical manuals, repair parts and special tools listings, the maintenance allocation chart (MAC), and parts allocation tables. Operational conditions will include movement to enhance survivability.

4.2 Criteria:

4.2.1 The AN/GRC-986(V) NCS crews will be able to practice and perform crew drills in garrison. 95% of the representative soldier operators must be capable of performing all critical tasks for their respective MOS to the assigned training standard.

4.2.2 The dedicated NCS maintenance teams (one per NCS), with allotted tools, test equipment, and repair parts, will sustain a division operation for a period of 30 days without negative impact on continuity of operations.

Figure H-2 (PAGE 2). A solution—Continued

4.3 Rationale: Units will come to combat “as is;” therefore, they must maintain proficiency during peacetime and be capable of sustaining operations until the logistics system catches up.

4.3.1 Criterion 4.2.1 is based on ORD requirement paragraph 13, which plans for an exportable packet for sustainment training.

4.3.2 Criterion 4.2.2 is based on ORD requirement paragraph 14 and the support concept of providing a dedicated maintenance teams for the NCS. The 30-day sustainment factor is minimum essential to allow the logistics system to catch up.

Note 1: Criteria are for total operational system measures. As such, they inherently cover hardware, software, personnel, doctrine, organization, and training. System individual characteristics of operational capability, survivability, RAM, organization, doctrine, tactics, logistics support, training, and MANPRINT (which includes the domains of manpower, personnel, training, human factors engineering, system safety, health hazards, and soldier survivability) related to these criteria will be provided by the system evaluator in the system evaluation plan.

Note 2: Criteria are not provided as automatic (default) pass/fail measures. Rather, they represent estimates of performance for which a breach would require a careful senior level management reassessment of cost effectiveness and program options during the program milestone decision review.

Note 3: This note would contain a definition of user specified speed of service (SOS).

Note 4: This note would contain a listing of Allied and other Service systems with which the AN/GRC-986(V) is required to be interoperable for data exchange and information exchange requirement (IER) matrix. The matrix would only present the critical IERs from the ORD applicable to this FRP decision.

Figure H-2 (PAGE 3). A solution—Continued
